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Sixth Supplement to the Uredinales and Ustilaginales of New Zealand.

By G. H. Cunningham, Mycologist, Plant Research Station, Palmerston North, New Zealand.

[*Read before the Wellington Philosophical Society, 27th June, 1928; received by Editor, 15th August, 1928; issued separately, 23rd November, 1928.*]

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By G. H. CUNNINGHAM, Mycologist, Plant Research Station, Palmerston North, New Zealand.

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RECENTLY, through the courtesy of Mr. W. R. B. Oliver, Acting-Director of the Dominion Museum, I was able to examine for the presence of Rust and Smut Fungi, the large number of New Zealand flowering plants in the Petrie Herbarium, now placed in the Dominion Museum, Wellington. From this large collection, surprisingly few fungi were obtained, about one hundred species in all, only one of which was undescribed.

Early this year I was enabled to make an extensive collecting tour through the provinces of Otago, Canterbury, Westland and Nelson, accompanied by Dr. H. H. Allan, Botanist to the Plant Research Station. Together we succeeded in obtaining approximately 600 collections of Rusts and Smuts, belonging to 78 species. Of these 18 were either undescribed or hitherto unrecorded for New Zealand.

The object of this paper is to present descriptions of these species, together with additional hosts, collected on this tour, or obtained from the Petrie Herbarium. Several additional stages of already described species have also been collected, necessitating one or two corrections in matter already published.

I am indebted to Dr. Allan for naming the hosts of all the collections obtained, and for the numerous collections he made for me during the tour.

UREDINALES.

***1. Puccinia arnaudensis** n. sp. JUNCACEAE.

O. Unknown.

II. Uredosori erumpent, scattered, bullate, pulverulent, ferruginous, elliptical, 1 mm. diam. Spores shortly elliptical or obovate, 35-40 x 22-25 mmm.†; epispore pallid ferruginous, 1.5-2 mmm. thick, except at the apex where thickened to 6 mmm. and deeper in colour, finely and densely echinulate; germ pores inevident.

III. Teleutosori erumpent, scattered, elliptical, 1-4 mm. long, bullate, pulverulent, chestnut-brown, surrounded by the ruptured epidermis. Spores subclavate or elliptical, 28-48 x 17-24 mmm.; apex rounded, not or scarcely thickened, base attenuate, less commonly rounded, basal cell larger and slightly narrower; not or slightly

*Illustrations of these species will be presented in a book on the New Zealand Uredinales, now in the course of preparation.

†mmm: abbreviation used for micron.

constricted at the septum; epispore chestnut-brown, 2 mmm. thick, finely and sparsely verrucose; pedicel deciduous, hyaline, fragile, to 20 x 6 mmm.; germ pore of the upper cell apical or less frequently ⅓ towards septum, basal pore immediately above the pedicel or between the septum and the pedicel, both conspicuous and occasionally papillate.

X. Mesospores rare, elliptical or obovate, 26-32 x 16-20 mmm.

Host: *Rostkovia gracilis* Hook. f.

Mt. St. Arnaud, Nelson, 1,800 m., 2/28. *H. H. Allan!* Type.

The host is endemic and confined to the mountain regions of the South Island (Cheesem. 1925, p. 291).

This species differs from *P. Rostkoviae* Speg. on *Rostkovia grandiflora* in South America, in the epispore of the teleutospore being verrucose, not smooth, and in the absence of paraphyses and presence of uredospores.

2. Puccinia Grahami n. sp. UMBELLIFERAE.

O. Pycnia amphigenous, conspicuous, scattered, associated with the aecidia, flask-shaped, semi-erumpent.

I. Aecidia amphigenous, chiefly epiphyllous, scattered evenly over the central parts of the leaf, and on petioles, seated on yellow spots; peridia 0.3-0.4 mm. diameter, cylindrical, standing above the leaf surface 1 mm., eroded, but not lacerate. Spores subglobose or shortly elliptical, 20-24 mmm.; epispore hyaline, 1 mmm. thick, minutely and densely verruculose.

III. Teleutospores amphigenous, compacted into dense linear series, 15 cm. or more in length, individual sori erumpent, elliptical, 0.5-1 mm. long, pulverulent, long covered. Spores elliptical or subclavate, irregular, 40-52 x 20-24 mmm; apex rounded, seldom bluntly acuminate, not or scarcely thickened, base acuminate, basal cell longer and narrower, cuneiform; slightly constricted at the septum; epispore delicately verruculose, chestnut-brown, 1.5-2 mmm. thick; pedicel deciduous, hyaline, to 25 x 6 mmm.; germ pore of the upper cell apical or ⅓ towards the septum, basal pore ⅓ to ⅔ below the septum, both conspicuous and papillate.

X. Mesospores common, obovate or fusoid, 35-48 x 20-24 mmm.

Hosts: *Aciphylla Monroi* Hook. f.

Sealey Lake, Mt. Cook, Canterbury, 1,500 m. 1/28. *H. H. Allan!* Type.

Mt. Trovatore, Westland, 1,200-1,500 m. 2/28. *G.H.C.*

Aciphylla Monroi x *Colensoi.*

Sealey Lake, Mt. Cook, Canterbury, 1,500 m. 1/28. *H. H. Allan!*

Both hosts are endemic, the former being confined to the mountain regions of the South Island (Cheesem. 1925, p. 665).

This species is peculiar in that in a considerable number of the teleutospores there may be two germ pores in the cell. For example, there may be two pores in the upper, and one in the lower cell; or two in the lower but one in the upper cell; but in no case has two pores in each cell been noted.

The rust is named in honour of Mr. Peter Graham, the well-known guide, for many years at Mt. Cook, now manager of Waiho

House, Franz Josef Glacier; to whom Dr. Allan and myself are indebted for a very interesting and profitable tour of the mountains in the region of the Franz Josef Glacier.

3. **Puccinia Kinseyi** n. sp.

O. Unknown.

I. Aecidia hypophyllous, when aggregated into small groups, and caulicolous when crowded on inflated, sometimes distorted areas which may attain a length of 25 mm. or more, and on fruits when scattered evenly over the carpels; peridia cupulate, 0.3-0.5 mm. diam., apex slightly erumpent, expanded but not revolute, lacerate when old. Spores subglobose or polygonal, 18-24 mmm. diam.; epispore hyaline, 1 mmm. thick, finely and densely verruculose.

II. Uredosori hypophyllous, scattered, orbicular, 0.5 mm. diameter, pulverulent, pallid brown, partly covered by the ruptured epidermis. Spores obovate or subglobose, 22-28 x 20-25 mmm.; epispore tinted lemon yellow, 1.5 mmm. thick, finely and rather sparsely echinulate; germ pores equatorial, 4, conspicuous.

III. Teleutosori similar to the uredosori but chestnut-brown. Spores elliptical or subclavate, 28-35 x 18-24 mmm.; apex rounded, not thickened, base rounded, basal cell slightly narrower; slightly constricted at the septum; epispore smooth, 2 mmm. thick, chestnut-brown; pedicel deciduous, hyaline, to 35 x 8 mmm.; germ pore of the upper cell apical, basal pore immediately above the pedicel, both often papillate and conspicuous.

Host: *Angelica geniculata* (Forst. f.) Hook. f.

Raikaia Gorge Island, Canterbury, 400 m. 1/28. *H. H. Allan!* Type.

The host is endemic and occurs in both Islands (Cheesem. 1925, p. 683). This species resembles most closely *P. Anisotominis* G. H. Cunn. on *Anisotome Haastii*, but is separated from this species in that the apices of the aecidiospores are not thickened, and by the much smaller teleutospores, those of *P. Anisotominis* being 40-60 x 17-22 mmm.

The rust is named in honour of Sir Joseph Kinsey, a staunch supporter of New Zealand botanical research.

4. **Puccinia keae** n. sp. COMPOSITAE.

O. Unknown.

III. Teleutosori scattered, hypophyllous, orbicular, 0.5-1 mm. diam., pulverulent, orange or pallid chestnut-brown, naked but covered by the tomentum of the leaf. Spores linear-oblong, or subclavate, 80-144 x 20-30 mmm.; apex rounded or less frequently slightly subacuminate, not thickened, base subattenuate, lower cell longer and narrower than the upper, usually cuneiform; constricted at the septum; epispore 1 mmm. thick, tinted, almost hyaline, smooth; contents orange yellow; pedicel persistent, hyaline, length of the spore; germ pore of the upper cell apical, basal pore immediately beneath the septum, both obscure.

Host: *Olearia nummularifolia* Hook. f.

Kea Point, Mt. Cook, Canterbury, 700 m. 1/28. *H. H. Allan-G.H.C.* Type.

The host is endemic and occurs in both Islands (Cheesem. 1925, p. 924).

The rust is very close to *P. hectorensis* G. H. Cunn. on *Senecio Bidwillii*, but differs in the thinner, tinted epispore, and slightly different shape of the teleutospore. The absence of an aecidium may also be a diagnostic character, but in the absence of pycnia it cannot be stated definitely that an aecidium does not occur in the cycle of the species under consideration.

The teleutospores germinate immediately on reaching maturity, giving to the sori a distinct orange colour.

5. **Puccinia perlaevis** n. sp.

O. Pycnia in small, scattered, epiphyllous, orbicular groups seated on discoloured spots, immersed.

I. Aecidia orange, in small scattered epiphyllous groups of 3-7, often on the mid-rib, seated on discoloured spots. Peridia cylindrical, standing above the leaf surface 1.5 mm., 0.3-0.5 mm. diameter, margins eroded, finally lacerate. Spores shortly obovate, subglobose or polygonal, 24-30 x 16-22 mmm.; epispore hyaline, 1 mmm. thick, covered with densely packed angular warts, appearing reticulate-areolate in consequence.

II. Uredosori scattered, hypophyllous, orange, fading to sulphur-yellow, crowded in the vicinity of the mid-rib, orbicular, 0.5-1.5 mm. diam., pulverulent, naked. Spores fusiform, clavate or seldom elliptical, pointed at one or both ends, 40-56 x 16-20 mmm.; epispore hyaline, smooth, 1.5 mmm. thick, thickened apically to 4 mmm.; germ pores absent, replaced by odd scattered thin places in the wall; mixed with numerous hyaline, cylindrical paraphyses.

III. Teleutosori similar to and mixed with the uredosori, sulphur-yellow. Spores elliptical or clavate, 80-100 x 20-30 mmm.; apex rounded, not or scarcely thickened, basal cell nearly twice as long as the upper, and narrower; constricted at the septum; epispore tinted brown, 1 mmm. thick, smooth; pedicel persistent, hyaline, to 140 x 8 mmm.; germ pore of the upper cell apical, basal pore immediately beneath the septum, both obscure; immixed with numerous hyaline cylindrical paraphyses.

X. Mesospores rare, elliptical or obovate, 30-50 x 18-26 mmm.

Host: *Olearia lacunosa* Hook. f.

Mt. Arthur, Nelson, 1,300 m. 2/28. *G.H.C.* Type.

Mt. Rangitaipo, Westland, 1,200 m. 2/28. *G.H.C.*

Mt. Trovatore, Westland, 1,000 m. 2/28. *G.H.C.*

Mt. Mantell, Westland, 1,000-1,500 m. 2/28. *G.H.C.*

Alecs' Knob, Franz Josef Glacier, Westland, 1,000 m. 2/28. *G.H.C.*

The host is endemic and fairly widely distributed through the South Island, but confined to the Tararuas of the North Island (Cheesem. 1925, p. 922).

This species possesses many peculiar features not present in any other New Zealand species; the uredosori are deeply embedded

in the host tissues, when they appear similar to aecidia, but as the spores are not in chains, nor enclosed within peridia, they cannot be confused with such. The most peculiar feature is that the uredospores are smooth, a character rare indeed for this spore stage in the Uredinales. Another peculiarity is that the uredosori are present in the cycle, the only example in which the complete cycle is known in New Zealand *Olearia* and *Senecio* inhabiting species. The teleutospores germinate immediately on reaching maturity, and arise from the uredosori.

6. Melampsora novae-zelandiae n. sp. EUPHORBIACEAE.

O. I. Unknown.

II. Uredosori hypophyllous, seated on discoloured spots, orbicular, 0.5-2 mm. diam., scattered or more regularly arranged in circinnate groups, erumpent, orange, fading to pallid ochraceous, surrounded by the ruptured epidermis. Spores subglobose, 16-20 mmm. diameter; epispore hyaline, 3-3.5 mmm. thick, moderately and finely verruculose; germ pores 6-8, scattered, obscure; immixed with numerous, hyaline, capitate paraphyses, swollen at the apex to 24 mmm.

III. Unknown.

Host: *Euphorbia glauca* Forst. f.

Seal Rock, Brighton, Westland, coast, 2/28. *G.H.C.* Type.

Charleston, Westland, coast, 2/28. *G.H.C.*

Cape Foulwind, Westland, coast, 2/28. *G.H.C.*

The host is indigenous and fairly widely spread from the North Cape southwards; it extends also to Norfolk Island (Cheesem. 1925, p. 542).

Although only uredospores are present on the abundant specimens at hand, the plant is obviously a *Melampsora;* the inflated hyaline paraphyses, and type of spores being typical of this genus. As several species have been recorded as occurring on *Euphorbia* elsewhere, and as it is not possible to refer this to any one of these on account of their general similarity in the uredostage, it has been provisionally described as new, until such time as the teleutospores are collected.

7. Aecidium westlandicum n. f. sp. RANUNCULACEAE.

O. Unknown.

I. Aecidia hypophyllous, yellowish, scattered evenly over the leaf surface, occasionally on petioles, not distorting; peridia 0.3-0.5 mm. diam., slightly erumpent, margins only showing above the inflated epidermis, scarcely reflexed, white, toothed; spores shortly elliptical, subglobose, seldom polygonal, 18-22 mmm. diam.; epispore hyaline, 1 mmm. thick, densely and minutely verruculose.

Hosts: *Caltha novae-zelandiae* Hook. f.

Sebastopol Range, Mt. Cook, Canterbury, 1,300 m., 1/28 *G.H.C.* Type.

Craigieburn Range, Canterbury, 1,500 m., 1/28. *H. H. Allan!*

Alecs' Knob, Franz Josef Glacier, Westland, 1,300 m., 1/28. *G.H.C.*

Caltha obtusa Cheesem.

Mt. Rangitaipo, Westland, 1,200 m., 2/28. *G.H.C.*

Both hosts are endemic and fairly widely distributed (Cheesem. 1925, p. 454-455).

The mycelium of this rust is systemic, etiolating the leaves and dwarfing the plant, and on this account rendering it conspicuous. Sometimes the aecidia parallel the mid-rib, forming lines of a few aecidia on either side.

Owing to the imperfect descriptions published elsewhere, and to the absence of specimens, it is not possible to identify this species with any other rust occurring on *Caltha*; the sorus characters separate it from a plant McAlpine (1906) has provisionally named *Aecidium Calthae* Grev. (the aecidial stage of *Puccinia Calthae* Link), and its systemic habit is a feature not recorded for other species occurring on the same host genus. In view of these facts it is provisionally named as new until such time as the teleutospores have been collected.

SCROPHULARIACEAE.

8. **Aecidium disciforme** McAlpine, *Rusts of Australia,* p. 194, 1906.

O. Unknown.

I. Aecidia amphigenous, chiefly hypophyllous, distorting and etiolating, systemic, scattered evenly and sparsely over the leaf surface; peridia sunken completely in the host tissues, 0.6-0.8 mm. diam., at first opening by a minute pore, becoming cupulate when old; peridial cells to 35 mmm. long, thin walled (2 mmm.), orbicular, readily separable, striated. Spores shortly elliptical, or subglobose, 18-24 mmm.; epispore hyaline, 2.5 mmm. thick, covered with dense coarse, rounded tubercules, contents reddish-orange.

Hosts: *Hebe glaucophylla* (Ckn.) Allan, comb. nov.

Mt. Mantell, Westland, 1,700 m., 2/28. *G.H.C.*

Hebe Traversii (Hook. f.) Ckn. et Allan.

Mt. Percival, Canterbury, 1,000 m., 1/28. *H. H. Allan!*

The systemic mycelium, completely submerged peridia with their thin walled, readily separable cells, are the characters of this species. McAlpine records this on *Veronica gracilis* R. Br. and *V. calycina* R. Br., and also mentions the fact that it causes thickening and distortion of the leaves.

9. **Aecidium Hebe** n. f. sp.

O. Unknown.

I. Aecidia hypophyllous, scattered evenly and sparsely over the leaf surface, lemon-yellow in mass; peridia cylindrical, deeply immersed, standing above the surface 0.2-0.3 mm., toothed, 0.3-0.4 mm. diam., finally disappearing in old specimens; peridial cells rhomboid, thick-walled, 6-8 mmm., sculptured, firmly compacted together. Spores polygonal or subglobose, 18-22 mmm. diam; epispore hyaline, densely and minutely verruculose; contents pallid lemon-yellow.

Hosts: *Hebe Treadwellii* Ckn. et Allan.
Black Birch Creek, Mt. Cook, Canterbury, 1,200 m., 1/28. *G.H.C.* Type.
Hebe macrantha (Hook. f.) Ckn. et Allan.
Sealey Range, Mt. Cook, Canterbury, 1,300 m., 1/28. *H. H. Allan.*
Hebe macrantha var. *brachyphylla* (Cheesem.) Ckn. et Allan.
Mt. Isobel, Canterbury, 900 m., 1/28. *G.H.C.*
Hebe Traversii (Hook. f.) Ckn. et Allan.
Mt. Isobel, Canterbury, 900 m., 1/28. *G.H.C.*
Hebe elliptica (Forst. f.) Pennell.
Seal Rock, Brighton, Westland, coast, 2/28. *G.H.C.*
Charleston, Westland, coast, 2/28. *G.H.C.*

This differs from the preceding in the different nature of the peridium, in not being systemic, and in the much finer markings of the spores. It differs from *Aecidium Veronicae* Berk. a species recorded from Australia, in that the spores are much smaller, and possess thinner episporeS.

CAMPANULACEAE.

10. **Aecidium microstomum** Berkeley, *Journ. Linnean Society*, vol. 13, p. 173, 1872.

A. Lobeliae Theum., *Grev.*, vol. 4, p. 75, 1875.

O. Pycnia in small groups, amphigenous, flask-shaped, semi-erumpent.

I. Aecidia amphigenous, crowded on leaves and petioles, etiolating, orange; peridia bullate, elliptical or subglobose, 0.5-2 mm. long, at first covered by the host tissue, and opening by a narrow pore, later becoming bullate and rupturing longitudinally; composed of a few scattered cells without definite cohesion, oval, flattened, to 40 mmm. long, verruculose. Spores subglobose, 22-24 mmm.; epispore hyaline, 2 mmm. thick, finely and densely tuberculate-areolate.

Hosts: *Pratia macrodon* Hook. f.
Kirkliston Range, Otago, 1,200 m., 1/28. *G.H.C.*
Craigieburn Range, Canterbury, 1,800 m., 1/28. *G.H.C.*
Mt. Trovatore, Westland, 1,300 m., 2/28. *G.H.C.*
Pratia angulata (Forst. f.) Hook. f.
Raikaia Gorge, Canterbury, 400 m., 1/28. *G.H.C.*

The latter host is endemic and fairly widely distributed; the former is confined to the South Island (Cheesem. 1925, p. 885).

The mycelium of this species is systemic, tending to etiolate and distort infected plants, rendering them conspicuous on this account. The very imperfect peridium is absent entirely from numerous sori, so that the plant is on the border line between an aecidium and a caeoma. When present the peridium consists of a few scattered dissociated cells, imperfectly cohering, and held in place by the epidermis; consequently this structure is seen as a rule only in young sori, before the epidermis has fissured.

McAlpine (1906, p. 149) has also commented on this fact; he records this stage on *Pratia erecta* Gaudich., *P. pedunculata* Benth., and *P. platycalyx* Benth., as well as on *Lobelia anceps* L., *L. pratioides* Benth., and *L. purpurascens* R. Br. He places the form

under *Puccinia aucta* Berk. et F. v. M., because *Lobelia anceps* is a host for both; he has not succeeded in finding both stages on the same host at the same time, however. I believe them to be distinct because in the numerous collections of the aecidium recorded above and of *Puccinia aucta,* aecidia are confined to *Pratia* spp., teleutospores to *Lobelia anceps.* Further, collections of *Lobelia anceps* taken at all times of the year from a locality near Seatoun, have yielded only teleutospores.

11. Aecidium Traversiae n. f. sp. COMPOSITAE.

O. Pycnia hypophyllous, associated with the aecidia, immersed.

I. Aecidia epiphyllous, on laterals and branches; on leaves in small scattered groups up to 5 mm. diam., on laterals and stems forming elliptical areas up to 10 mm. long, pallid yellow; peridia 0.4-0.5 mm. diam., flask-shaped, opening to the exterior by a small aperture, scarcely evident above the surface of the tissues, margins fimbriate. Spores irregular in shape, elliptical, tending to fusiform, clavate or pyriform, sometimes apiculate, 36-43 x 22-28 mmm.; epispore hyaline, 1.5 mmm. thick, densely and finely verruculose.

Host: *Traversia baccharoides* Hook. f.

Mt. Mantell, Westland, 1,700 m., 2/28. *G.H.C.* Type.

The host is endemic and confined to the mountains of the South Island (Cheesem. 1925, p. 1027).

On laterals are sometimes produced distorted inflations, but as a rule the rust is evident only on account of the colour of the aecidia in mass.

12. Aecidium otira n. f. sp.

O. Pycnia chiefly epiphyllous, flask-shaped, sparse, scattered, immersed, associated with the aecidia.

I. Aecidia amphigenous and on petioles and stems, in scattered groups of 3-5, seated on discoloured spots visible on both surfaces, pallid orange, becoming lemon yellow; peridia 0.4-0.5 mm. diam., up to 2 mm. above the leaf surface, at first cylindrical, and scarcely revolute, eroded, becoming lacerate with age; cells polyhedral, to 70 mmm. long, hyaline, thick walled, sculptured. Spores elliptical, or obovate, 38-52 x 22-28 mmm.; epispore hyaline, 1.5 mmm. thick, densely covered with angular deciduous warts, appearing reticulate.

Host: *Olearia arborescens* (Forst. f.) Ckn. et Laing.

Mt. Egmont, Taranaki, 1,000 m., 2/23. *E. H. Atkinson!*; 1,300 m., 4/25, *J. C. Neill!*; 11/27, 1,000 m., *G.H.C.*

Arthur's Pass, Canterbury, 900 m., 1/28. *G.H.C.*

Alecs' Knob, Franz Josef Glacier, Westland, 1,300 m., 1/28 *G.H.C.*

The host is endemic and common throughout (Cheesem. 1925, p. 919). The aecidium shows a general resemblance to that of *Puccinia novae-zelandiae* G. H. Cunn. (and was included under this species in a previous paper) in its cylindrical shape, but differs in the hyaline, not tinted epispore, and in this structure being reticulate and not verruculose.

13. **Uredo haumata** n. f. sp. GRAMINEAE.

II. Uredosori hypophyllous, seated on discoloured spots visible on the upper surface, scattered and elliptical when up to 3 mm. long, or aggregated into linear series 1 cm. or more in length, pulverulent, pallid ferruginous brown, partly covered by the ruptured epidermis. Spores subglobose, or shortly elliptical, 36-42 x 32-36 mmm.; epispore pallid chestnut-brown, 2 mmm. thick, moderately and finely verruculose; germ pores scattered, 7-11, obscure.

Hosts: *Danthonia Cunninghamii* Hook. f.

Base of Stocking Glacier, Mt. Cook, Canterbury, 1,000 m., 1/28. *G.H.C.*

Tasman Moraine, Mt. Cook, Canterbury, 800 m., 1/28. *G.H.C.* Type.

Danthonia flavescens Hook. f.

Little Peel, Canterbury, 1,000 m., 1/28. *G.H.C.*

Both hosts are endemic and widely distributed (Cheesem. 1925, p. 172).

The spores are larger than those described by McAlpine (1906) for *Uromyces Danthoniae* from Australia, but otherwise show a general resemblance, especially in the numerous scattered germ pores. The species shows also a general resemblance to *Uredo toetoe* G. H. Cunn. on *Arundo conspicua,* but is separated by the much larger spores.

14. **Uredo Schoenus** n. f. sp. CYPERACEAE.

II. Uredosori scattered, seldom confluent, seated on discoloured reddish spots, elliptical, 1-2 mm. long, erumpent, bullate, long covered, ferruginous. Spores elliptical or obovate, 40-48 x 24-28 mmm.; epispore pallid fuscous, or yellowish-brown, 3 mmm. thick, save at the apex where thickened to 6 mmm. and darker in colour, moderately and somewhat coarsely echinulate; germ pores equatorial, 3-4, obscure.

Host: *Schoenus pauciflorus* Hook. f.

Cook Range, Canterbury, 700 m., 1/28. *G.H.C.* Type.

The host is endemic and common throughout (Cheesem. 1925, p. 229).

15. **Uredo moschatus** n. f. sp. COMPOSITAE.

II. Uredosori hypophyllous, scattered, orbicular, 0.5-1 mm. diam., pulverulent, pallid lemon-yellow, deeply immersed in the tomentum of the leaf. Spores subglobose or obovate, 24-30 x 20-24 mmm.; epispore hyaline, 1 mmm. thick, finely and closely covered with small round-topped deciduous verrucae; germ pores equatorial, 3-4, not definite, appearing usually as thin places in the wall; immixed with numerous cylindrical, hyaline paraphyses.

Host: *Olearia moschata* Hook. f.

Black Birch Creek, Mt. Cook, Canterbury, 1,200 m. 1/28. *G.H.C.* Type.

The host is endemic and confined to the South Island (Cheesem. 1925, p. 923).

The hyaline thin epispore characterizes the species.

16. **Uredo Cheesemanii** n. f. sp.

II. Uredosori crowded in epiphyllous, orbicular groups up to 5 mm. diam., deeply sunken in the tissues so that the apertures alone are visible, 0.5 mm. diam. Spores shortly elliptical, slightly obovate, often angular, 40-56 x 32-44 mmm.; epispore pallid cinnamon-brown, 4-5 mmm. thick, sparsely and irregularly echinulate; germ pores equatorial, 4, obscure.

Host: *Senecio Adamsii* Cheesem.

Mount Arthur Plateau, Nelson, *T. F. Cheeseman.* Type.

The host is endemic and occurs in both Islands; but is confined to the Tararua Range in the North Island. (Cheesem. 1925, p. 1024).

The sori resemble aecidia in that they are submerged within the flask-shaped cavities in the host tissues; the resemblance is further strengthened in that the cavities are in part lined with fungous tissue in the nature of a pseudoparenchyma; but as the spores are not in chains, and as no definite peridial cells are present, the plant must be considered an *Uredo.*

The species is named from material taken from a collection of the host in the Petrie herbarium, collected by the late Mr. T. F. Cheeseman.

Additional Hosts.

Puccinia hectorensis G. H. Cunn. (*T.N.Z.I.*, vol. 54, p. 683, 1923).
Senecio viridis Kirk.
Mt. Mantell, Westland, 1,700 m. 2/28. *G.H.C.*
Senecio elaegnifolius Hook. f.
Mountain south of Fox Glacier, Westland 1,000 m. 1/28. *G.H.C.*

Puccinia Atkinsonii G. H. Cunn. (*Ibid.*, vol. 54, p. 675, 1923).
Olearia ilicifolia Hook. f.
Franz Josef Glacier, Westland, 250 m. 1/28. *G.H.C.*
Olearia ilicifolia x *lacunosa* (= *O. mollis* (Kirk) Ckn.).
Mt. Rangitaipo, Westland, 1,200 m. 1/93. *D. Petrie!*
Teramakau River, Westland, 150 m. 1/93. *D. Petrie!*

Puccinia pounamu G. H. Cunn. (*Ibid.*, vol. 54, p. 688, 1923).
Senecio bellidioides Hook. f.
Mt. Mantell, Westland, 1,800 m. 2/28. *G.H.C.*

Puccinia whakatipu G. H. Cunn. (*Ibid.*, vol. 55, p. 4, 1924).
Anisotome petraea Cheesem.
Mt. Torlesse, Canterbury, 1,100 m. 1/93. *D. Petrie!*
Takitimu Mts., Southland, 1,200 m. 12/12. *D. Petrie!*
Anisotome imbricata (Hook. f.) Ckn.
Mt. Trovatore, Westland, 1,000 m. 2/28. *G.H.C.*

Puccinia kopoti G. H. Cunn. (*Ibid.*, vol. 54, p. 668, 1923).
Anisotome intermedia Hook. f.
Catlin's River, Otago, *J. T. Bryant!* (ex Petrie Herb.).
Anisotome pilifera (Hook. f.) Ckn. et Laing.
Mt. Trovatore, Westland, 1,500 m. 2/28. *G.H.C.*

Puccinia Celmisiae G. H. Cunn. (*Ibid.*, vol. 55, p. 8, 1924).
Celmisia Armstrongii Petrie.
Arthurs Pass, Canterbury, 700-1,000 m. 1/28. *H. H. Allan-G.H.C.*
Celmisia Lyallii Hook. f.
Sebastopol Range, Mt. Cook, Canterbury, 1,300 m. 1/28. *G.H.C.*
Celmisia Lyallii x *longifolia.*
Sebastopol Range, Canterbury, 1,500 m. 1/28. *G.H.C.*
Celmisia Lyallii x *spectabilis.*
Mt. Torlesse, Canterbury, 1,200 m. 1/28. *G.H.C.*
Celmisia Traversii Hook. f.
Mt. Arthur, Nelson, 1,300 m., 1,930 m. 2/28. *G.H.C.*
Mt. Trovatore, Westland, 1,200 m. 2/28. *G.H.C.*
Celmisia graminifolia Hook. f.
Mt. Trovatore, Westland, 1,700 m. 2/28. *G.H.C.*

Puccinia pulverulenta Grev. (*Ibid.*, vol. 54, p. 665, 1923).
Epilobium Cockaynianum Petrie.
Mt. Holdsworth, Wellington, 1,250 m. 1/08. *D. Petrie!*
Epilobium junceum Spreng.
Hermitage, Mt. Cook, Canterbury, 700 m. 1/28. *H. H. Allan!*

Puccinia Plagianthi McAlp. (*Ibid.*, vol. 54, p. 660, 1923).
Hoheria Lyallii Hook. f.
Mt. Hutt, Canterbury, 1,000 m. 1/28. *G.H.C.*
Broken River, Canterbury, 700 m. 1/28. *H. H. Allan!*
Hoheria glabrata Sprag. et Summ.
Arthurs Pass, Canterbury, 900 m. 1/28. *G.H.C.*
Hoheria angustifolia Raoul.
Banks Peninsula, Canterbury, 150 m. 1/28. *H. H. Allan!*

Puccinia inornata G. H. Cunn. (*Ibid.*, vol. 54, p. 657, 1923).
Cardamine bilobata Kirk.
Castle Hill, Canterbury, 600 m. 1/28. *G.H.C.*

Aecidium Plantaginis-variae McAlp. (*Ibid.*, vol. 55, p. 36, 1924).
Plantago Brownii Rapin.
Sebastopol Range, Mt. Cook, Canterbury, 1,300 m. 1/28. *G.H.C.*

Aecidium Celmisiae-discoloris G. H. Cunn. (*Ibid.*, vol. 55, p. 37, 1924).
Celmisia incana Hook. f.
Mt. Percival, Canterbury, 1,800 m. 1/28. *H. H. Allan!*
Celmisia incana x *discolor.*
Mt. Rangitaipo, Westland, 1,000-1,200 m. 2/28. *G.H.C.*
Celmisia novae-zelandiae (Buch.) Cheesem.
Cook Range, Canterbury, 700 m. 1/28. *G.H.C.*
Sebastopol Range, Canterbury, 1,300-1,700 m. 1/28. *H. H. Allan!*
Kirkliston Range, Otago, 1,200 m. 1/28. *G.H.C.*
Celmisia Walkeri Kirk.
Mt. Rangitaipo, Westland, 1,200 m. 2/28. *G.H.C.*
Alecs' Knob, Franz Josef Glacier, Westland, 1,300 m. 1/28. *G.H.C.*

Celmisia viscosa Hook. f.
Otira River, Westland, 1,350 m. 1/93. *D. Petrie!*

Aecidium Celmisiae-Petrici G. H. Cunn. (*Ibid.*, vol. 55, p. 38, 1924).

Celmisia Haastii Hook. f.
Mt. Rangitaipo, Westland, 1,200. 2/28. *H. H. Allan!*

Alterations and Corrections.

Aecidium Macrodontae G. H. Cunn. (*Ibid.*, vol. 55, p. 38, 1924).

This form species has now been connected with its teleutosporic stage, and becomes in consequence a synonymn of *Puccinia Atkinsonii* G. H. Cunn.

Uredo southlandicus G. H. Cunn. (*Ibid.*, vol. 55, p. 44, 1924).

This is a synonym of *Uredo Brownii* Syd. (*Annales Mycologici*, vol. 5, p. 338, 1907). Sydows' name was overlooked when my former papers were prepared; but as their name has priority it must supersede that given.

Aecidium Celmisiae-petiolatae G. H. Cunn. (*Ibid.*, vol. 55, p. 37, 1924).

This has now been found to be the aecidial stage of *Puccinia Celmisiae* G. H. Cunn.

Uredo konini nov. nom.
Coleosporium Fuchsiae Cke., *Grev.*, vol. 14, p. 129, 1886.

In a former paper I followed Cooke in placing this species in *Coleosporium*; but recent critical examination of numerous collections has shown that it is not a *Coleosporium*, but an *Uredo*; for the uredo-spores are not in chains but are borne singly on distinct pedicels; and no other spore stage is known. The species cannot be named *Uredo Fuchsiae*, for this combination is already occupied, being used by Arthur and Holway (Arthur, *Am. Jour. Bot.*, vol. 5, p. 538, 1918) for a species on *Fuchsia splendens* Zucc. from Guatemala. As the sole record of the family Coleosporiaceae occurring in Australasia was based on the assumption that this was a species of *Coleosporium*, it is now necessary to delete this family from the list of those occurring in this botanical region.

Examination of the abundant material listed below, has shown that in addition to the correction noted above, the species is peculiar in that two distinct spore types are present; therefore it is considered necessary to replace the description given (*T.N.Z.I.*, vol. 55, p. 25, 1924) by the following emended one:

Uredosori amphigenous, often seated on small angular yellow spots, orbicular, 0.5-1 mm. diam., orange-yellow, pulverulent, surrounded by the ruptured epidermis. Spores of two types: (i) spores obovate or obovate-elliptical, 30-40 x 22-28 mmm.; epispore hyaline, 1.5-2 mmm., thickened apically to 5 mmm., coarsely and sparsely echinulate, spines more prominent apically; (ii) spores 18-24 x 12-18 mmm.; epispore 1 mmm. thick, except at the apex where thickened to 3 mmm.; germ pores inevident.

Hosts: *Fuchsia excorticata* Linn. f.

Type (i): York Bay, Wellington, 100 m. 4/26. *G.H.C.*
Hutt Valley, Wellington, 9/81. *T. Kirk!* Co-type.
Peel Forest, Canterbury, 500 m. 1/28. *H. H. Allan!*
Franz Josef Glacier, Westland, 250 m. 1/28. *G.H.C.*

Type (ii): Weraroa, Wellington, 30 m. 7/19. *G.H.C.*
York Bay, Wellington, 50 m. 10/20. *E. H. Atkinson!*
Seatoun, Wellington, coast. 3/22. *G.H.C.*
Hamilton, Auckland, 100 m. 5/22. *G.H.C.*

Fuchsia perscandens Ckn. et Allan.

Type (ii): Seal Rock, Brighton, Westland, coast. 2/28. *H. H. Allan!*
Feilding, 50 m. 8/28. *H. H. Allan!*

Both these spore types are similar in sorus characters, markings of the epispore, and shape; differing only in size of the spores and corresponding thickness of the epispore and size of the markings. It might be supposed that two species were involved, but the finding of both types of spore in the same sorus has shown them to be but forms of the same species.

USTILAGINALES.

(1) **Tilletia Anthoxanthi** Blytt. GRAMINEAE.

Forh. Vid.-Selsk. Christ. 1896, p. 31, 1896.

Sori in ovaries, completely enclosed within the glumes, ovate, up to 3 mm. long, becoming pulverulent. Spores subglobose or globose, 22-30 mmm. diam.; epispore covered with a network of raised reticulations 3 mmm. high, surrounding polygonal depressions 3-5 mmm. wide, chestnut-brown.

Host: *Anthoxanthum odoratum* L.

Waimakariri Gorge Bridge, Canterbury, 400 m. 1/27. *G.H.C.*

Bennetts, Canterbury, 250 m. 1/27. *G.H.C.*

Distribution: Europe; North America; New Zealand.

(2) **Cintractia Schoenus** n. sp. CYPERACEAE.

Sori in occasional ovaries, sometimes in all, at first enclosed within the glumes, becoming naked when black, firm and compact, subglobose, to 2 mm. diam. Spores subglobose, shortly elliptical or often angular, 18-24 x 14-18 mmm.; epispore smooth, dark fuscus-brown, almost black, 3 mmm. thick.

Host: *Schoenus pauciflorus* Hook. f.

Cook Range, Canterbury, 700 m. 1/28. *G.H.C.* Type.

This species was abundant on this host in the locality recorded; but was not noted elsewhere despite the fact that hundreds of plants were examined.

(3) **Tuburcinia novae-zelandiae** n. sp RANUNCULACEAE.

Sori amphigenous and caulicolous, up to 25 mm. diam., black, pulverulent, distorting and etiolating the host. Spore balls to 60 mmm. in length, but very variable in size and shape, ranging from as few as two spores surrounded by 7-8 sterile cells, to balls with 20-30 spores enclosed within a complete envelope of sterile cells. Spores subglobose or elliptical, arranged mostly with their long axes longitudinally, 16-22 x 12-16 mmm.; epispore chestnut-brown, 1.5-2 mmm. thick, smooth; sterile cells subglobose, 8-14 mmm. diam., epispore pallid brown, smooth, 1.5 mmm. thick.

Host: *Ranunculus tenuicaulis* Cheesem.

Mt. Mantell, Westland, 1,800 m. 2/28. *G.H.C.* Type.

The host is an endemic species with a limited distribution in the mountain regions of both Islands (Cheesem. 1925, p. 442).

This smut is characterized in that the spore balls are often large and contain numerous spores; differing in this respect from other species of the genus recorded on *Ranunculus* and related genera.

Additional Host.

Ustilago Avenae Jens. (*T.N.Z.I.*, vol. 55, p. 405, 1924).
Avena fatua L.
Hororata, Canterbury. 1/27. *J. C. Neill!*

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McAlpine, D., 1906. *The Rusts of Australia*, 349 pp., Melbourne.

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